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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/602,508 | 06/24/2003 | John E. Smee | 020515 | 2193 |
| 7590 | 04/04/2006 | | EXAMINER | |
| QUALCOMM Incorporated Attn: Patent Department 5775 Morehouse Drive San Diego, CA 92121-1714 | | | CORRIELUS, JEAN B | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2611 | |

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/602,508 | SMEE ET AL. | |
| | Examiner | Art Unit | |
| | Jean B. Corrielus | 2611 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 24 June 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-21 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1-8 and 17-21 are objected to because of the following informalities:
claim 1, line 7, "sliced" should be inserted before "chip". The same comment applies to
claim 18, line 7. Claim 4, line 1, recites "estimates" while claim 1, recites "estimate".
Claim 17, line 2, "can be" should be replaced by "is". Note that any claim whose base
claim is objected is likewise objected. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly
claiming the subject matter which the applicant regards as his invention.

3. Claims 1-8, 10 and 18-21 are rejected under 35 U.S.C. 112, second paragraph,
as being indefinite for failing to particularly point out and distinctly claim the subject
matter which applicant regards as the invention.

Claim 1, last line, "the chip slicer" lacks of proper antecedent basis.

The same comment applies to claim 4 and claim 18, last two lines.

Claim 3 recites, "decision directed updating" however, it is not clear however what is
being updated. The same comment applies to claim 10.

Claim 5, line 2, "the feedback filter" lacks of proper antecedent basis.

Claim 19 recites “a chip slicer” in line 2 however there is an unclear antecedent in claim 18, last two lines.

Note that any claim whose base claim is objected is likewise objected.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-14 and 16-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Webster et al US Patent No. 6,233,273.

As per claim 1, Webster et al discloses a method and apparatus comprising receiving a frame see fig. 5 in a digital communications stream, the frame having a training portion see col. 10, lines 20-21 and a data portion see for instance output of decision 105, wherein the data portion comprises inherently an encoded symbol, the encoded symbol having a plurality of code words see fig. 5 wherein each code word has a plurality of chips see col. 7, lines 46-50 and col. 8, lines 3-6, slicing a chip from the encoded symbol using “chip decision” 76; removing interference from the chip using feedback filter 75 ; deriving a more accurate symbol estimate for the sliced chip based on a correlation among the chips in the code word (i. e. output of matched filter 33)

using the combiner 73; and providing the more accurate symbol estimate (i. e. output of combiner 73) as input to the chip decision 76 (chip slicer).

As per claim 2, the receiving step (inherently) has to receive the encoded symbol during the data portion of the frame.

As per claim 3, as per the limitation “decision directed updating during data portion of a frame”, note that the value output by the combiner 73 is changed (updated) based (responsive) to the decision signal output by the decision circuit 76 during data portion of a frame. Hence such limitation is taught by Webster.

As per claim 4, because of the removal of interference from the received signal by adder 73 to generate the estimate, at least 50% of the estimate has to be more accurate since the interference has been removed.

As per claim 5, the more accurate symbol estimate are provided to the feedback filter and the estimate are stored in the taps of the feedback filter 75 via decision device 76.

As per claim 6, the feedback filter 75 uses the more accurate estimate stored in the filter taps for improved performance in removing interference from chip because the filter received the update from the decision device at the input.

As per claim 7, because the interference is removed by the combiner element 73 at least 50% of the symbol estimates stored in the FB filter 75 has to be more accurate.

As per claim 8, because of the presence of the feedback loop, the method is repeated to create more reliable symbol estimates relative to older symbol estimates derived and wherein the more reliable symbol estimates are used in the feedback filter

75 to inherently improve the accuracy of the symbol estimates being fed into the chip decision circuit 76 (chip slicer).

As per claim 9, Webster et al teaches a chip decision circuit 76 (chip slicer) for extracting a chip from a code word, the code word received as part of an encoded symbol in a digital communication stream see fig. 5; a feed back filter 75 configured to remove interference from sliced chips, the feedback filter 75 having a plurality of content registers see fig. 8; and a combiner 73 (chip combiner) configured to derive a more accurate symbol estimate for a sliced chip, wherein the combiner 73 (chip combiner) provides improved symbol estimates to the chip decision 76 (chip slicer).

As per claim 10 the taps (content registers) are updated with more accurate symbol estimates based (during) decision directed updating (i. e as provided by decision circuit 76) note that the value(s) stored in the taps change(s) as the decision circuit 76 provides new (updated) output signal.

As per claim 11, see claim 7.

As per claim 12, the feedback filter 75 uses FIR filter wherein the FIR subtracts out postcursor intersymbol interference from the current slicer input see col. 8, lines 12-20 and col. 9, lines 51-54.

As per claim 13, see claim 1.

As per claim 14, Webster teaches a preprocessor 33 for carrying out signal processing tasks and providing a feed forward filter 71 with baseband samples the feed forward filter 71 for processing the baseband samples and for sending a digital data stream to a chip (decision) slicer 76 in combination with any signal added or subtracted

by a chip combiner 73; and a feedback filter 75 for processing previous chip slicer outputs to subtract out postcursor inter symbol interference from the current input to the chip slicer 76.

As per claim 16, Webster et al teaches the chip slicer 76 is configured to extract a portion of the data stream that corresponds to a single chip of a codeword see col. 3, line 57. and col. 7, lines 10-12.

As per claim 17, Webster et al further teaches the feedback filter 75 feeds the noise component back into the chip slicer 76 by way of a chip combiner 73 so that the noise component can be subtracted from the next incoming signal from the feed forward filter 71 before the next incoming signal is fed into the chip slicer 76. 18.

As per claim 18, see claim 1.

As per claim 19, Webster et al teaches that the means/step for slicing a chip from the encoded symbol further comprises a chip slicer 76 for extracting a chip from a code word, the code word received as part of an encoded symbol in a digital communication stream.

As per claim 20 the means for removing interference includes a FB filter 75 having a plurality of taps (content registers).

As per claim 21 the means for deriving a more accurate symbol estimate for the sliced chip based on a correlation among the chips in the code word comprises a chip combiner 73 configured to derive a more accurate symbol estimate for a sliced chip, and wherein the chip combiner provides improved symbol estimates to the chip slicer 76.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Webster.

As per claim 15, Webster et al teaches every feature of the claimed invention but does not explicitly teach the coefficients for the feed forward filter and the feedback filter are selected based on minimum mean square error (MMSE) criterion using either adaptive techniques or based on computations involving a channel estimate. However it is well known in the art for equalizer to generate coefficients for the feed forward filter and the feedback filter are selected based on minimum mean square error (MMSE) criterion using either adaptive techniques or based on computations involving a channel estimate. Given that, it would have been obvious to one skilled in the art to calculate coefficients for the feed forward filter and the feedback filter are selected based on minimum mean square error (MMSE) criterion using either adaptive techniques or based on computations involving a channel estimate so as to take advantage of its enhanced technical feature such as reduced complex processing.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean B. Corrielus whose telephone number is 571-272-3020. The examiner can normally be reached on Maxi-Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jean B Corrielus
Primary Examiner
Art Unit 2611
3-30-06